

IN THE SPECIFICATION

Please replace the paragraph beginning at page 1, line 6, with the following replacement paragraph:

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The present invention is related to the invention described in U.S. Patent Application Attorney Docket No. Laroia 12-4-1-1 Serial No. 09/503,040, filed concurrently herewith in the name of inventors R. Laroia et al. and entitled "Uplink Timing Synchronization and Access Control for a Multi-Access Wireless Communication System," which is incorporated by reference herein.

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Please replace the paragraph beginning at page 4, line 1, with the following replacement paragraph:

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Another aspect of the invention provides techniques for optimizing the tone frequencies and coefficients of the multitone timing and access signals. In accordance with these techniques, tone frequencies and the magnitudes of the complex multitone coefficients can be determined using the criterion of time resolvability, while the phases of the complex coefficients are determined using the criterion of peak-to-average ratio. More particularly, to combat channel fading, the tones of each multitone signal are selected to span a large frequency range for frequency diversity. This diversity may be achieved by constructing each multitone signal of groups of contiguous tones, with the groups separated beyond the channel coherence bandwidth. FIR Finite impulse response (FIR) filter design techniques, such as Chebychev polynomials, may be used to determine coefficient magnitudes of the tones in each contiguous group. The coefficient phases of tones in each multitone signal are then selected to minimize the resultant peak-to-average ratio without affecting the optimized property of time resolvability.

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Please replace the paragraph beginning at page 5, line 16, with the following replacement paragraph:

*(A3)*

The above-cited U.S. Patent Application Attorney Docket No. Laroia 12-4-1-1 Serial No. 09/503,040 discloses systems for OFDM synchronization and access control in which mobiles transmit certain timing and access signals in dedicated timing and access intervals. In an illustrative embodiment of such a system, the timing and access intervals occur periodically in the uplink stream, and all regular uplink data transmission is suspended during the intervals. For access, new mobiles transmit one of a pre-specified set of access signals during the interval, and the base station searches each interval for the presence of the access signals to detect the access requests. If an access request is detected and granted, the base station can send an access acknowledgment in the downlink containing uplink and downlink channel assignments along with initial timing and power corrections. Similarly, for re-synchronization, mobiles can transmit pre-specified synchronization signals in the timing and access intervals. The base station can measure the arrival times of the signals, and transmits appropriate timing corrections back to the mobiles in the downlink.

*(A4)*

Please replace the paragraph beginning at page 17, line 14 with the following replacement paragraph:

After clipping, the clipped tracking error  $g_k$  is passed through a standard integrating tracking loop comprising element 204 with static gain  $L$ , summing element 206, and feedback delay element 208 as shown. The gain  $L \in [0,1]$  of element ~~+52204~~ can be adjusted to trade response time versus noise filtering.

*(A5)*

Please replace the paragraph beginning at page 17, line 19, with the following replacement paragraph:

A simple example will now be provided to illustrate the design procedures described above. Consider an OFDM system having the parameters shown in Table 1. The parameters are based on an outdoor cellular wireless system with voice traffic. We assume a symbol period of  $T_{SYM}=100 \mu s$ , which provides a symbol rate of 10 ksymbols per second. With QPSK quaternary phase shift keying (QPSK) modulation, this rate is adequate to support, on single tone, a standard voice coding

*15*

rate of 9.6 kbps with rate  $\frac{1}{2}$  coding. The maximum delay spread assumption of  $\delta_{\max} = 5 \mu\text{s}$  would cover worst-case channels in non-mountainous terrain. The cyclic prefix of  $15 \mu\text{s}$  allows for the  $5 \mu\text{s}$  delay spread along with timing errors of  $\pm 5 \mu\text{s}$ . The fundamental tone period is  $T = T_{\text{SYM}} - T_{\text{CP}} = 85 \mu\text{s}$ , and the tone spacing is  $1/T = 12.5 \text{ kHz}$ . A standard bandwidth allocation of 5 MHz, fits  $N_1 = 380$  tones with 5% excess bandwidth. To support FFT processing, which requires a number of tones equal to a power of two, we assume for this example that the sample window is sampled at  $N=512$  points, but the top 132 tones are not used.

*16*

Please replace the paragraph beginning at page 18, line 6 with the following replacement paragraph:

To align the sample window and adjust the guard times, we also need to make some assumptions on the timing errors. We will assume for this example that the offset, timing error,  $\Delta$ , between the signal arrival time and the beginning of the base station timing and access interval is bounded,  $\Delta \in [\Delta_{\min}, \Delta_{\max}]$ , with the values of  $\Delta_{\min}$  and  $\Delta_{\max}$  shown in Table 1. As mentioned previously, timing estimates with  $T$ -periodic multitone signals are ambiguous up to multiples of  $T$ . Thus, it is necessary that  $\Delta_{\max} - \Delta_{\min} < T$  for the timing error  $\Delta$  to be estimated unambiguously. Different timing bounds are assumed for the timing re-synchronization and access signals. For access signals, the timing error is the round-trip propagation time between the base station and mobile. The timing error bound of  $[0, 70 \mu\text{s}]$  allows for cell radii of up to 10.5 km. For re-synchronization signals, the timing error is the error just before re-synchronization. Assuming the mobile is synchronized within the cyclic prefix before re-synchronizing, the maximum timing error could be  $\pm 15 \mu\text{s}$ . For safety, a slightly larger range of  $\pm 20 \mu\text{s}$  is assumed in Table 1.